

What is claimed is:

1. A photonic switching system comprising:

demultiplexing logic for demultiplexing optical data streams from a
5 plurality of incoming fibers;

dropping/passing logic operably coupled to the demultiplexing logic
for receiving the demultiplexed optical data streams from the demultiplexing
logic and selectively dropping or passing each demultiplexed optical data
stream;

10 photonic switching logic operably coupled to the dropping/passing
logic for receiving the passed optical data streams from the dropping/passing
logic and switching each passed optical data stream to an output port of the
photonic switching logic; and

combining logic operably coupled to combine the switched optical data
15 streams from the photonic switching logic with a number of new optical data
streams to form a plurality of outgoing optical signals.

2. The photonic switching system of claim 1, wherein the demultiplexing
logic comprises a plurality of demultiplexers, each demultiplexer couplable to
20 an incoming fiber for demultiplexing optical data streams from the incoming
fiber.

3. The photonic switching system of claim 1, wherein the
dropping/passing logic comprises a plurality of drop-only fabrics, each drop-
25 only fabric operably coupled to receive a plurality of demultiplexed optical
data streams from the demultiplexing logic and selectively drop or pass each
demultiplexed optical data stream.

4. The photonic switching system of claim 1, wherein the combining logic
30 comprises a plurality of combiners, each combiner operably coupled to
combine a plurality of switched optical data streams from the photonic cross-

connect switch with a number of new optical data streams to form an outgoing optical signal.

5. The photonic switching system of claim 1, wherein the combining logic
5 comprises:

first combiners, each of said first combiners operably coupled to combine a plurality of switched optical data streams from the photonic cross-connect switch to form a combined optical signal; and

- 10 second combiners, each of said second combiners operably coupled to combine the combined optical signal from a corresponding first combiner with a number of new optical data streams to form an outgoing optical signal.

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6. A photonic switching apparatus comprising:
demultiplexing logic for demultiplexing optical data streams from a
plurality of incoming fibers;
dropping/passing logic operably coupled to the demultiplexing logic
for receiving the demultiplexed optical data streams from the demultiplexing
logic and selectively dropping or passing each demultiplexed optical data
stream;
photonic switching logic operably coupled to the dropping/passing
logic for receiving the passed optical data streams from the dropping/passing
logic and switching each passed optical data stream to an output port of the
photonic switching logic; and
combining logic operably coupled to combine the switched optical data
streams from the photonic switching logic with a number of new optical data
streams to form a plurality of outgoing optical signals.

7. The photonic switching apparatus of claim 6, wherein the
demultiplexing logic comprises a plurality of demultiplexers, each
demultiplexer couplable to an incoming fiber for demultiplexing optical data
streams from the incoming fiber.

8. The photonic switching apparatus of claim 6, wherein the
dropping/passing logic comprises a plurality of drop-only fabrics, each drop-
only fabric operably coupled to receive a plurality of demultiplexed optical
data streams from the demultiplexing logic and selectively drop or pass each
demultiplexed optical data stream.

9. The photonic switching apparatus of claim 6, wherein the combining
logic comprises a plurality of combiners, each combiner operably coupled to
combine a plurality of switched optical data streams from the photonic cross-
connect switch with a number of new optical data streams to form an
outgoing optical signal.

10. The photonic switching apparatus of claim 6, wherein the combining logic comprises:

first combiners, each of said first combiners operably coupled to combine a plurality of switched optical data streams from the photonic cross-
5 connect switch to form a combined optical signal; and

second combiners, each of said second combiners operably coupled to combine the combined optical signal from a corresponding first combiner with a number of new optical data streams to form an outgoing optical signal.

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11. A photonic switching system comprising:

demultiplexing logic for demultiplexing optical data streams from a plurality of incoming fibers;

dropping/passing logic operably coupled to the demultiplexing logic

5 for receiving the demultiplexed optical data streams from the demultiplexing logic and selectively dropping or passing each demultiplexed optical data stream;

10 photonic switching logic operably coupled to receive the passed optical data streams from the dropping/passing logic and a number of new optical data streams and to switch each of said optical data streams to an output port of the photonic switching logic; and

combining logic operably coupled to combine the switched optical data streams from the photonic switching logic to form a plurality of outgoing optical signals.

15 12. The photonic switching system of claim 11, wherein the demultiplexing logic comprises a plurality of demultiplexers, each demultiplexer couplable to an incoming fiber for demultiplexing optical data streams from the incoming fiber.

20 13. The photonic switching system of claim 11, wherein the dropping/passing logic comprises a plurality of drop-only fabrics, each drop-only fabric operably coupled to receive a plurality of demultiplexed optical data streams from the demultiplexing logic and selectively drop or pass each
25 demultiplexed optical data stream.

30 14. The photonic switching system of claim 11, wherein the combining logic comprises a plurality of combiners, each combiner operably coupled to combine a plurality of switched optical data streams from the photonic cross-connect switch to form an outgoing optical signal.

15. A photonic switching apparatus comprising:
demultiplexing logic for demultiplexing optical data streams from a plurality of incoming fibers;
dropping/passing logic operably coupled to the demultiplexing logic
5 for receiving the demultiplexed optical data streams from the demultiplexing logic and selectively dropping or passing each demultiplexed optical data stream;
photonic switching logic operably coupled to receive the passed optical data streams from the dropping/passing logic and a number of new
10 optical data streams and to switch each of said optical data streams to an output port of the photonic switching logic; and
combining logic operably coupled to combine the switched optical data streams from the photonic switching logic to form a plurality of outgoing optical signals.

15 16. The photonic switching apparatus of claim 15, wherein the demultiplexing logic comprises a plurality of demultiplexers, each demultiplexer couplable to an incoming fiber for demultiplexing optical data streams from the incoming fiber.

20 17. The photonic switching apparatus of claim 15, wherein the dropping/passing logic comprises a plurality of drop-only fabrics, each drop-only fabric operably coupled to receive a plurality of demultiplexed optical data streams from the demultiplexing logic and selectively drop or pass each
25 demultiplexed optical data stream.

18. The photonic switching apparatus of claim 15, wherein the combining logic comprises a plurality of combiners, each combiner operably coupled to combine a plurality of switched optical data streams from the photonic cross-
30 connect switch to form an outgoing optical signal.